

REMARKS

Applicants appreciate the notification that claims 55-57 and 59 have been allowed. The applicant notes that claim 96, which depends upon claim 55, should also have been allowed, and respectfully requests confirmation of this in the next communication.

Claims 11, 12, 15-17, 20-23, 42, 43, 46-51, 85-90 and 103 have been objected to as being dependent on a rejected base claim, but they would be allowable if rewritten. Claims 1, 6, 10, 13, 14, 24, 28-35, 37, 41, 44, 45, 52-54, 80, 91-95, 97-102 and 104-108 have been rejected.

Claims 11, 28, 35, 98 and 107 have been amended, and claim 10 has been cancelled. Claims 1, 6, 11-17, 20-24, 28-35, 37, 41-59, 80 and 85-108 are pending.

Claims 98 and 107 have been amended to insert the word --to-- so that these claims are grammatically correct. These changes are cosmetic and do not affect the meaning or the scope of these claims. No new matter has been added.

In view of the above amendments and the following remarks, the applicant respectfully requests favorable reconsideration and allowance of the application.

The sections set forth below are presented in the same order as that of the Action for ease of reference.

Informality Objection

Claim 10 was objected to for depending on cancelled claim 9. Claim 10 has been cancelled herein. Consequently, claim 11, which depended on claim 10, has been amended to depend upon claim 6. No new matter has been added. Thus, withdrawal of this objection is warranted.

Claim Rejections under 35 U.S.C. 112

Claim 28 was rejected for lacking proper antecedent basis for the recitation of "said burst". Consequently, claim 28 has been amended to remove the word "said". Thus, claim 28 is now believed to be in proper form, and withdrawal of this rejection is respectfully requested.

Claim Rejections under 35 U.S.C. 102(e)

Claims 1, 6, 10, 13, 14, 24, 33-35, 37, 41, 44, 45, 52-54, 80, 91-93, 97-102 and 104-107 have been rejected for allegedly being anticipated by Beller et al., U.S. Patent No. 6,046,717 ("Beller").

The present invention pertains to a compact, high resolution, high contrast and head-mounted display system, particularly useful for use in surgical viewing. In a first embodiment shown in Fig. 1A, an endoscopy video camera within a surgical patient provides video image signals to a base station 112, and a transceiver 110 according to the invention transmits a baseband video signal to a receiver connected to an electronic circuit. The electronic circuit applies the baseband signal to the video display device for viewing by the surgeon. In particular, the transceiver 108 utilizes an array of infra-red (IR) light emitting diodes (LEDs) to emit the baseband video signal 106 through the atmosphere, and the signal 106 bounces off a reflective ceiling 116 to a receiver 302 on the headset 104 (see also Figs. 3A-3C). In a second embodiment shown in Fig. 1B, the transceiver 110 is suspended from the ceiling 116 to enable an LED array 130 to directly transmit the baseband signals 132 to the headset 104.

In contrast to the present invention, Beller discloses a communication system for providing communications from a wearer of a head mounted system to an operator of a remote system. For example, the wearer may be a repairman at a worksite who is trying to fix a broken piece of equipment. The wearer can view video inputs received from the remote system so that they appear to be superimposed upon the real world to enable her to make any necessary repairs (see Beller, col. 1, lines 7-17).

The Beller system utilizes a radio frequency network including a plurality of base stations 202, 203 for providing communications between the head mounted system 10 and the remote terminal 13 (see Fig. 1 and col. 7, lines 21-25). Beller teaches to use a frame grabber processor 80 to process one frame of an image at a time, and uses an analog-to-digital converter 82 to convert the gray level signals from the camera to a digital representation. A microprocessor 88 is used to couple the data to be transmitted to a radio-frequency communication system 96 which formats the data in packets (col. 6, line 45 to col. 7, line 12). In an embodiment, a radio frequency network 200 includes base stations 202, 203 coupled to each other by a high speed network backbone such as an Ethernet or Token Ring network (see col. 7, lines 20-26). The remote assistant's terminal 13 includes a radio frequency communications system 104 coupled to a processor 110 that controls the information depicted on display 19 so that images from the head mounted system 13 are displayed in real time (see col. 7, lines 49-56). The processor 110 operates in accordance with the flow chart of Fig. 6 to receive and to transmit video and audio data (see col. 10, line 44 to col. 11, line 26). Thus, Beller fails to teach or suggest a video processing circuit configured to output a baseband video signal as recited in pending claim 1.

Beller also fails to teach a transceiver module comprising a cluster of infrared light-emitting diodes coupled to the video processing circuit for transmitting the baseband signal as also recited in claim 1. Beller mentions using a camera 15 with a lens assembly and a photosensor array for processing an image, wherein the photosensor array is an array of photodiodes or preferably a charged-coupled device (CCD) array (see col. 6, lines 26-44). There is no suggestion or teaching, however, to use a cluster of infrared light-emitting diodes to transmit a baseband signal. Use of such a cluster of LEDs is advantageous for several reasons. In particular, an LED cluster is less expensive than a single laser diode, and the spatially distributed nature of the LED cluster does not have the high power density characteristic of the laser diode and thus minimizes the chances that the signal will be totally blocked on the way to the headset. Furthermore, the low power density of the LED array avoids design considerations and concerns related to potential eye damage and associated regulatory controls, such as FDA regulations (see present application, page 8, lines 14-20).

Since Beller does not teach or even suggest to generate or use a baseband video signal, and does not teach to use a cluster of infrared light emitting diodes, claim 1 is not anticipated. Furthermore, since claims 6, 11-17, 20-24, and 28-34 all directly or indirectly depend on claim 1, these claims should also be allowable for at least the same reasons.

Independent claim 35 has been amended to replace the word "modulated" in line 3 with --baseband--. This cosmetic change was made to correct a clerical error because antecedent basis for the phrase "said modulated video signal" no longer existed after claim 35 had been amended in the previous response. No new matter has been added.

Independent claim 35 recites an apparatus having a video processing circuit configured to output a baseband video signal, a remote receiver for receiving the baseband video signal, a remote electronic circuit, and a transceiver module comprising a cluster of infrared light-emitting diodes located proximate the receiver and configured to output said baseband video signal to the receiver at least in part through a free atmospheric path. As explained above, Beller fails to teach or even suggest components for generating and using a baseband video signal as recited in claim 35. Furthermore, Beller fails to teach or suggest a transceiver module comprising a cluster of infrared light-emitting diodes for transmitting the baseband signal. Use of such a cluster of LEDs is advantageous because it avoids potentially adverse design considerations, avoids concerns related to potential eye damage, and avoids associated regulatory control considerations, as mentioned above. Thus, since Beller does not teach or even suggest components for generating and utilizing a baseband video signal, and does not teach to use a cluster of infrared light emitting diodes, claim 35 is not

anticipated. Furthermore, since claims 37, 41-54, 94 and 95 all directly or indirectly depend on claim 35, these claims should also be allowable for at least the same reasons.

Independent claim 80 pertains to a method for operating a remote video display device. Claim 80 recites the steps of generating a baseband video signal, transmitting it using a plurality of light-emitting diodes through a free atmospheric path to a remote receiver coupled to the remote video display device, and applying the baseband video signal to control and drive the remote video display device. As explained above, Beller fails to suggest or teach to generate a baseband video signal, and also does not suggest or teach to transmit the baseband video signal using a plurality of infrared light-emitting diodes coupled to the remote video display device. Since Beller does not teach or suggest such operation, claim 80 is not anticipated. Furthermore, since claims 85-93 all directly or indirectly depend on claim 80, these claims should also be allowable for at least the same reasons.

Independent claim 97 recites an apparatus including a video interface for a remote video display. It includes a video processing circuit that outputs a baseband video signal having a bandwidth of at least 85 MHz, a remote receiver adapted for receiving the baseband video signal, and a remote electronic circuit configured to apply the baseband video signal to control and drive the remote video display device. As explained above, Beller fails to suggest or teach any components for generating and utilizing a baseband video signal. Since Beller does not teach or suggest such structure or operation, claim 97 is not anticipated. Furthermore, since claims 98-108 all directly or indirectly depend on claim 97, these claims should also be allowable for at least the same reasons.

In view of the above remarks, the applicant respectfully requests withdrawal of all of the 35 U.S.C. 102(e) rejections.

Claim Rejections under 35 U.S.C. 103

Dependent claims 28-32, 94, 95 and 108 were rejected for allegedly being unpatentable over the Beller patent in view of Kosugi et al., U.S. Patent No. 6,483,483 ("Kosugi").

Kosugi pertains to an eyeglasses type image display that is connected to a computer 18 by a cable 12 (see col. 3, lines 1-10 and Figs. 1 and 6). Another embodiment is mentioned wherein the eyeglasses communicate with a computer via infrared rays using "predetermined standards" (col. 5, lines 22-34). Thus, Kosugi was cited only for teaching a circuit that is configured to illuminate a video display device sequentially with light from colored LEDs in synchronism with bursts of pixel luminance data, and for allegedly teaching, in combination

with Beller, alternately operating two separate video display devices. But Kosugi does not suggest or teach to generate and utilize a baseband video signal, and therefore does not remedy the deficiencies of the Beller patent. Therefore, neither the Beller or Kosugi patents, alone or in combination, teaches or suggests the methods or apparatus recited by present independent claims 1, 35 and 97. These claims are thus patentably distinct thereover, and since 28-32, 94, 95 and 108 all directly or indirectly depend on these independent claims, they also should be allowable for at least the same reasons.

In view of the above remarks, the applicant respectfully requests withdrawal of the 35 U.S.C. 103 rejections of claims 28-32, 94, 95 and 108.

The applicant respectfully asserts that, none of the cited references, either alone or in combination, teaches or suggests the methods or apparatus as recited in pending independent claims 1, 35, 80 and 97. Thus, withdrawal of all of the rejections is respectfully requested.

In view of the above amendments and remarks, the applicant respectfully requests favorable reconsideration and allowance of all of the pending claims of the application.

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Respectfully submitted,


Allan A. Fanucci Reg. No. 30,256

WINSTON & STRAWN
CUSTOMER NO. 28765

(212) 294-2649

NY:817026.1